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COMPLETE SPECIFICATION.

Improvements relating to Couplings for Pipes.

We, THE GAS COUNCIL, a British Body Corporate, of 4/5 Grosvenor Place, London, S.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to quick release couplings of the kind comprising a tubular plug which fits detachably into a socket with a bayonet connection. When the two parts are coupled together the plug is sealed in the socket by means of a main O sealing ring retained within the socket with the interior of the tubular plug in communication with the interior of the socket. The socket incorporates a spring loaded outlet valve having a valve closure member which is urged by the spring pressure towards a seating to close the valve but which is engaged by the plug when the plug is fitted into the socket and is moved against the action of the spring away from the seating to open the valve.

Such a coupling is useful, for example, in connecting a flexible hose forming an inlet conduit of a gas cooker to a rigid gas supply pipe. In this case the socket will be fitted on the end of the supply pipe and the tubular plug will be fitted on the end of the hose. This enables the gas cooker to be removed from the gas supply pipe by a householder simply by undoing the coupling without fear of gas leakage from the gas supply pipe terminating in the socket.

In accordance with the present invention in a coupling of the kind described, the bayonet ears are formed integrally with a metal ring from which they project radially inwards, the ring being nonrotatably located in the entrance to the socket and the ears co-operating with the complementary bayo-

net slots provided in the outer wall of the tubular plug.

Preferably, the ring is held in position by a circlip against an annular shoulder which is formed on the inner wall of the socket and which faces in the axial direction out of the socket. Alternatively the circlip may be replaced by a gland nut.

The ring is preferably prevented from rotating relatively to the rest of the socket by means of a further one or more integral ears which project radially outwardly from the ring and lie into slots in the wall of the socket.

The ring may be simple annular washer plate with which the ears are integrally formed by a stamping operation. The ears are then very accurately located in position and the ring and ears can be assembled very simply and quickly by inserting the ring into the entrance to the socket and locating it for example on the shoulder by fitting the circlip into groove.

In order to avoid rotating the tubular plug relatively to a pipe to which it is in use fitted, when doing up or undoing the bayonet connection with the socket part of the coupling, the bayonet slots in the outer wall of the tubular plug are preferably formed in a collar which is axially located on but rotatably relatively to, the body of the plug. The collar may be formed integrally with an outwardly projecting knurled flange, or other shaped part, forming a finger-piece for controlling the connection of the two parts of the coupling together.

The axial location between the collar and the rest of the plug may be provided at least in part by a spring circlip which seats both in an annular groove in the outer surface of the body of the plug and in an annu-

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lar groove in the inner surface of the collar. Once the collar has been assembled on the body of the plug the circlip is inaccessible so that the plug has a neat appearance without preventing relative rotation between the collar and the body of the plug. The axial location of the collar on the body of the plug may be assisted by a shoulder on the body against which an end of the collar engages to prevent relative axial movement in one direction. The collar is then assembled with the body of the plug by slipping it over one cylindrical end of the body whereupon an internal chamfered end portion of the collar overrides the spring circlip which has previously been fitted in the annular groove in the outer surface of the body. The end portion of the collar reaches the shoulder on the body just as the spring circlip snaps into the annular groove in the inner surface of the collar.

The valve closure member is preferably pushed off its seating when the plug is fitted into the socket by a portion of the plug which projects through the annular seating and engages the valve closure member. Alternatively however the valve closure member could extend through the seating and be engaged by an end portion of the tubular plug.

In order to provide automatic shutoff of fluid, such as gas, flowing through the coupling when the coupling is made, in the event of fire, there may be interposed between the plug and the closure member in the coupled position a part which normally transmits the thrust which holds the valve closure member off its seating but which, when the coupling is subjected to a temperature above a predetermined value, loses its rigidity and allows the valve closure member to move under the action of its spring onto the seating to close the socket in spite of the fact that the tubular plug is still fitted in the socket.

The part may be a mass of solder in, or a metal disc held by solder in the entrance to, a recess in the face of the valve closure member, the part then being directly engaged by the tubular plug in the coupled position. With this arrangement if the coupling were subjected in a fire to a sufficiently high temperature to destroy the main seal between the plug and socket, the part would fail to continue to transmit the necessary thrust between the plug and valve closure member to keep the valve closure member off its seating and the valve closure member would move to its closed position. Thus if the socket were fitted to the end of a town gas supply pipe, the supply of gas would be cut off and would not add to the conflagration.

Some examples of couplings constructed in accordance with the present invention are

illustrated in the accompanying drawings in which:

Figure 1 is a side elevation of a straight coupling with part in central axial section showing the plug and socket coupled together;

Figure 2 is a side view similar to Figure 1 showing the same coupling uncoupled;

Figure 3 is an exploded perspective view of the mating parts of the plug and socket;

Figure 4 is a section taken on the line IV—IV in Figure 1;

Figure 5 is a view similar to Figure 1 but of an angle coupling; and,

Figures 6 and 7 are similar scrap axial sections showing modified forms of valve closure members suitable for use in the couplings of Figures 1 and 5.

One main part of the coupling shown in Figures 1 to 4 is a socket 8 formed integrally with a co-axial internally screw threaded union 9 for connection to a fluid supply pipe, such as a domestic town gas pipe. An internal frustoconical surface 10 in the socket forms a seating for a valve closure member 11 which has conical face co-operating with the seating. The closure member 11 is urged by a helically coiled compression spring 12 to move so that an O sealing ring 13 which seats in an annular groove in the frustoconical face of the closure member seals against the seating 10 as shown in Figure 2. The end of the spring 12 takes its reaction against a ring 14 which is held in the socket by a circlip 15.

Within the socket 8 proper a larger O sealing ring 16 seats in an internal annular groove and a ring in the form of an annular washer plate 17 is retained against a shoulder formed at the base of an enlarged entrance 18 to the socket by a circlip 19 which fits into an annular groove 20. The ring 17 is integrally formed with diametrically opposed radially inwardly and outwardly extending ears 21 and 22. The ears 22 fit into open ended axially extending slots 23 in the socket wall to prevent the ring 17 from rotating in the socket. The ears 21 form bayonet lugs.

The other main part of the coupling is a tubular plug 24 formed integrally with a union 25 for fitting to the end of a pipe 26, such as a flexible hose for a domestic gas cooker. The nose of the plug 24 is formed with an integral projecting spigot 27 surrounded by four ports 28 which are drilled through the end face of the plug. A collar 29, formed integrally with a knurled ring 30, forming a finger piece, is rotatably but axially located on the plug 24 against the shoulder 31 by a circlip 32 which fits both in an annular groove in the plug and an internal annular groove in the collar. During assembly of the plug the circlip 32 is fitted into the groove of the plug and the

collar is slipped axially over the nose of the plug until a chamfered portion 33 of the collar 29 rides over the circlip 32. The circlip 32 snaps into the groove in the collar as its end face reaches the shoulder 31. The collar 29 thus constitutes the sidewall of the plug and is formed with diametrically opposed bayonet slots 34 which co-operate with the ears 22 on the ring 17.

When the plug 24 is disconnected from the socket 8, as shown in Figure 2, the socket is sealed by the valve closure member 11. However, when the plug 24 is inserted into the socket, it rubs through the sealing ring 16 which seals the plug and socket together and at the same time the spigot 27 pushes the valve closure member off its seating against the action of the spring 12 and puts the supply pipe, which will be connected to the union 9, into communication with the pipe 26, through the interior of the plug 24. The plug is held in the socket by rotation of the collar 29 by means of the finger-piece 30 so that the ears 21 co-operate with the bayonet slots 34. The ears are then held in the bayonet slots by the action of the spring 12. This is shown in Figure 1.

Figure 5 shows an angle coupling the tubular plug 24 and associated parts of which are identical to those of the first example shown in Figures 1 to 4. Although the socket 8a has a slightly different external shape from the socket 8 of the first coupling, its valve closure member 11, O sealing ring 16, bayonet ring 17, and all other parts which co-operate directly with the plug 24 are identical to those of the first example. The only significant difference is that a union 9a for connection to a supply pipe, is externally screw threaded and is set at right angles to the main axis of the coupling. Also the spring 12 in this example takes its reaction against a shoulder of a closure plug 35 which screws into an end of the socket 8a with the interposition of a sealing washer 36.

Figure 6 shows a modification in which the valve closure member 11 of the first or second example is replaced by a valve closure member 11a. The face of the member 11a is provided with a recess 37 containing solder 38. The spigot 27 engages the solder which transmits the necessary thrust between the plug and valve closure member to hold the member off its seating when the parts are coupled together. In the event of excessively high temperature however the solder 38 will melt and allow the spigot 27 to enter the recess in the face of the member 11a so that the member will close on to its seating again under the action of the spring 12 and seal the socket.

Figure 7 shows another modification of valve closure member 11b. In this modification the entrance to the recess 37 is normally

closed by a disc 39 which is soldered in position. In the event of the solder melting under excessively high temperatures, the disc 39 will move back in the recess 37 as the closure member 11b moves under the action of the spring 12 on to its seating 10. As the disc 39 moves through the recess 37, fluid in the recess will be vented through a passage 40.

WHAT WE CLAIM IS:—

1. A coupling of the kind described, in which the bayonet ears are formed integrally with a metal ring from which they project radially inwards, the ring being non-rotatably located in the entrance to the socket and the ears co-operating with complementary bayonet slots provided in the outer wall of the tubular plug.

2. A coupling according to claim 1, in which the ring is held in position against an annular shoulder which is formed on the inner wall of the socket and which faces in the axial direction out of the socket by a circlip or gland nut.

3. A coupling according to claim 1 or claim 2, in which the ring is prevented from rotating relatively to the rest of the socket by means of a further one or more integral ears which project radially outwardly from the ring and lie in slots in the wall of the socket.

4. A coupling according to any one of the preceding claims in which the ring is a simple annular washer plate with which the ears are integrally formed.

5. A coupling according to any one of the preceding claims, in which the bayonet slots in the outer wall of the tubular plug are formed in a collar which is axially located on but rotatable relatively to, the body of the plug.

6. A coupling according to claim 5, in which the axial location between the collar and the rest of the plug is provided at least in part by a spring circlip which seats both in an annular groove in the outer surface of the body of the plug and in an annular groove in the inner surface of the collar.

7. A coupling according to any one of the preceding claims, in which the valve closure member is pushed off its seating when the plug is fitted into the socket by a portion of the plug which projects through the annular seating and engages the valve closure member.

8. A coupling according to any one of the preceding claims, in which there is interposed between the plug and the valve closure member in the coupled position a part which normally transmits the thrust which holds the valve closure member off its seating but which, when the coupling is subjected to a temperature above a predetermined value, loses its rigidity and allows the valve

closure member to move under the action of its spring on to the seating to close the socket in spite of the fact that the tubular plug is still fitted in the socket.

- 5 9. A coupling according to claim 1, substantially as described with reference to Figures 1 to 4, or Figure 5, or to Figures 1 to 4 or 5 when modified in accordance with

either Figure 6 or Figure 7 of the accompanying drawings. 10

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Fig. 1.

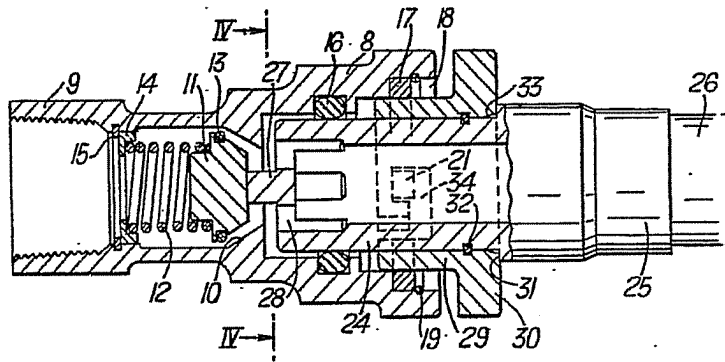
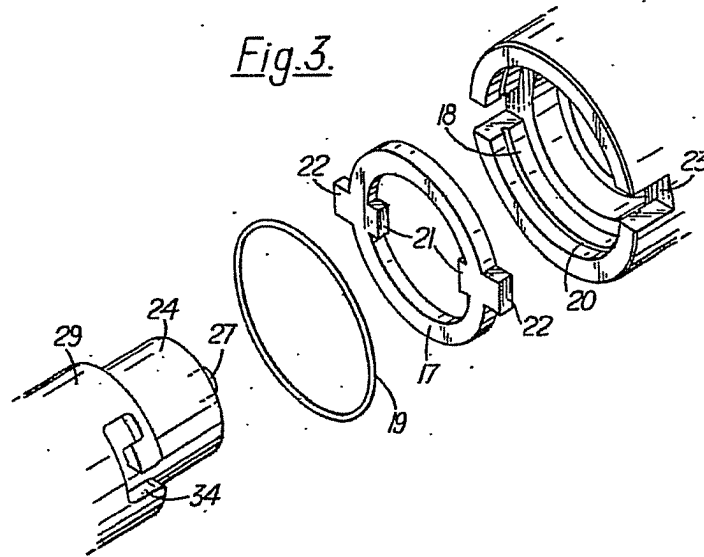


Fig. 3.



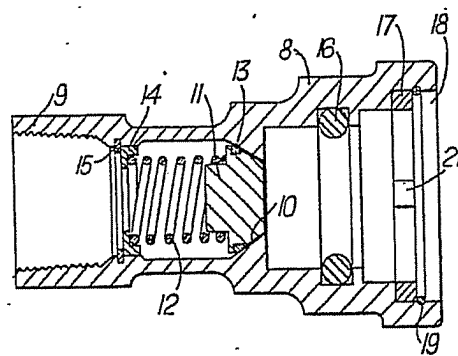
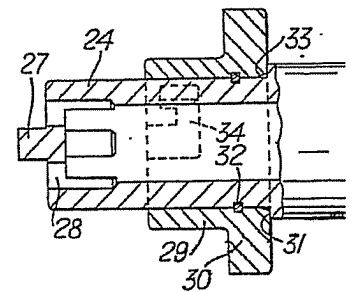


Fig. 2.



COMPLETE SPECIFICATION

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